

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>P755-PCT</b>	<b>FOR FURTHER ACTION</b>		See Form PCT/PEA/416
International application No. <b>PCT/JP2004/012223</b>	International filing date (day/month/year) <b>19.08.2004</b>	Priority date (day/month/year) <b>19.08.2003</b>	
International Patent Classification (IPC) or national classification and IPC <b>C21D1/76, C23C2/06, C21D8/04</b>			
<p><b>Applicant</b>  <b>NIPPON STEEL CORPORATION et al.</b></p>			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>(sent to the applicant and to the International Bureau) a total of sheets, as follows:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</i></p>			
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the opinion</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>			
Date of submission of the demand <b>16.03.2005</b>	Date of completion of this report <b>10.08.2005</b>		
Name and mailing address of the international preliminary examining authority:  <b>European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465</b>	Authorized Officer <b>Lilimpakis, E</b> Telephone No. +49 89 2399- 		

INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY

10/568997  
IAP20 Rec'd PCT/IPO 16 FEB 2006  
International application No.  
PCT/JP2004/012223

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

**Description, Pages**

1-21 as originally filed

**Claims, Numbers**

1-6 as originally filed

**Drawings, Sheets**

1/2-2/2 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):
4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/JP2004/012223

---

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

---

1. Statement

Novelty (N)	Yes:	Claims	1-3
	No:	Claims	4,5
Inventive step (IS)	Yes:	Claims	1-3
	No:	Claims	4,5
Industrial applicability (IA)	Yes:	Claims	1-5
	No:	Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

---

**Box No. VII Certain defects in the international application**

---

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

---

**Box No. VIII Certain observations on the international application**

---

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.

PCT/JP2004/012223**Re Item V****Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

- D1: PATENT ABSTRACTS OF JAPAN vol. 2002, no. 02, 2 April 2002 (2002-04-02) & JP 2001 279412 A (NIPPON STEEL CORP), 10 October 2001 (2001-10-10)
- D2: PATENT ABSTRACTS OF JAPAN vol. 0041, no. 35 (C-025), 20 September 1980 (1980-09-20) & JP 55 085622 A (NIPPON KOKAN KK < NKK >; others: 01), 27 June 1980 (1980-06-27)
- D3: US 2003/047255 A1 (DELAUNAY DIDIER ET AL) 13 March 2003 (2003-03-13)

2. The simultaneous control of the claimed parameters in order to promote the internal Si oxidation and thus forming an inner oxide, while controlling the environment oxidation is theoretically revealed in D3 (par.9,10,17,24-27).

D1 or D2 pertain exact measures, in particular the partial pressures control for H<sub>2</sub>O as log(PH<sub>2</sub>O/PH<sub>2</sub>) in relation to Si content.

D2 reveals the control of CO/CO<sub>2</sub>/H<sub>2</sub>/H<sub>2</sub>O during annealing for a Zn-plated steel sheet to avoid oxidation.

3. Even combining the teachings of at least D1 with D2, the skilled person could not arrive to the claimed features, in particular who to influence the internal oxidation of Si with respect to wetting ability during hot dip Zn-plating.

The claimed process (**Claim 1**) is not revealed or rendered obvious from any of the cited documents, it is therefore novel (Art.33(2) PCT) and inventive (Art.33(3) PCT).

The same is mutatis-mutandis applied for **claims 2 and 3**.

4. Given the clarity objections in item VIII/3, **claims 4 and 5** cannot be acknowledged as new or inventive (Art.33(2) and (3) PCT). The sole apparatus features are:

- a radiant heating furnace,
- an apparatus for introducing or burning hydrocarbons and introducing the products, and
- a continuous galvannealing line.

Thus, apart from the controlling parameters dictated in the process claims (and which are not restrictive for an apparatus claim), the above features are per se

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.  
PCT/JP2004/012223

either alone or in combination known (D2). In any apparatus of the same type there is a precise control for the introduction of gases.

**Re Item VII**

**Certain defects in the international application**

1. In the claims and the entire description the term "log(PCO<sub>2</sub>/PH<sub>2</sub>) of the water partial pressure and the hydrogen partial..." appears not correct.
2. The prior art must be cited and the description with the corrections should be accordingly adapted.

**Re Item VIII**

**Certain observations on the international application**

1. The subject-matter of claim 1 should define that the process takes place "in a all radiant heating annealing furnace" (essential feature).
2. The term "effective Al % concentration" (claims 2 and 3) is not clear in its meaning. The Applicant must shed light to what he means. No upper limit is given in claims 2 or 3, in contrast to p.13 (Al <0.092 %).
3. Both claims 4 and 5 relate to an "equipment" or "system" for performing the process of claims 1-3, however, the apparatus claims disclose features of the process per se which do not delimit the said apparatus or equipment from any similar ones.